

## Taxonomic confusion among gall-thrips and host-plants, with three new combinations from the genus *Austrothrips* (Thysanoptera, Phlaeothripidae)

LAURENCE MOUND

CSIRO Australian National Insect Collection, PO Box 1700, Canberra, ACT 2601. E-mail: laurence.mound@csiro.au

### Abstract

The genus *Austrothrips* is considered a *nomen dubium* because the types are lost and the type species description is uninformative. *Austrothrips flavitibia* Moulton is transferred to the genus *Teuchothrips* and *Austrothrips vanuaensis* Moulton is transferred to the genus *Solomonthrips*. The gall-inducing *Austrothrips cochinchinensis* Karny is transferred to *Ocnothrips* as a senior synonym of the type species, *O. indicus*. The host of *cochinchinensis* is recognised as a vine-like shrub, *Getonia floribunda*, that is widespread between western India and southeast China.

**Key words:** *Ocnothrips*, *Teuchothrips*, *Solomonthrips*, leaf-galls, fungus-feeding

### Introduction

The induction of pouch galls by a thrips known as *Austrothrips cochinchinensis* on the axillary buds of a plant referred to as *Calycopteris floribunda* was first reported by Rao (1924). This author discovered the galls at Malabar in southwestern India, and he thanked H. Karny for examining the thrips and identifying them as a species previously known only from Thailand (Karny 1922). Multiple references to these galls and their thrips are available (Ananthakrishnan 1978, 1984a,b, 1992; Ananthakrishnan & Raman 1989), and the insect/plant association has been assumed to be an example of host specificity. However, recent studies have indicated that there are problems both with the names and the indicated distributions of the plant and also of the thrips, and these problems occur at both genus and species level. The objective here is to shed some light on these problems, with particular attention to the significance of the genus *Austrothrips* and the four species of thrips that have been associated with that generic name. Nomenclatural details of the thrips mentioned here are available in ThripsWiki (2020).

### Host plant identity

Despite the frequency with which it is used in the thrips literature, the generic name, *Calycopteris* in the plant family Combretaceae, is a junior synonym of *Getonia* (<http://www.plantsoftheworldonline.org/>). Hence the correct name for this vine-like shrub that bears thrips galls is *Getonia floribunda*. Under the first generic name the plant has been stated to be common in the Western Ghats, India, but under the second name it is known to have a wide natural distribution between western India and Yunnan in southwestern China. Associated with this plant in India (Rao 1924) is a gall-inducing species of Thysanoptera, Phlaeothripinae, *Austrothrips cochinchinensis*. However, this thrips was described by Karny (1922) based on specimens from “Southern Siam, Ban Klang Tahu, No. 43”. Karny stated that this thrips was taken from leaf galls on “*Hymenodactyon parviflorum*”, a tree in the plant family Rubiaceae, although the original slide, bearing the number 43 (Fig. 6), names the plant as a member of the Combretaceae, with the generic name “*Quisqualis*?” . The original publication also mentions a second collection of this thrips, taken from an unidentified plant near Saigon (=Ho Chi Min City, Vietnam). Recent study of these original slides has confirmed that the specimens are conspecific with the thrips species that is found in the Western Ghats, India, inducing axillary pouch galls on *Getonia floribunda*. This calls into question the host association published by Karny, particularly

as it was prefaced by a query mark. The host indicated on the original microscope slide (Fig. 6) seems more nearly correct in indicating that the original host was a species of Combretaceae. The suggested generic name, *Quisqualis*, is now a synonym of *Combretum*, and *C. indicum* is another scrambling vine-like shrub that is not entirely unlike *Getonia floribunda*. Thus it is possible that the original host plant of the galling thrips *cochinchinensis* was incorrectly identified. A further complication is discussed below, because this gall thrips has now been found in India within the galled leaves of two more plant species that are generically unrelated.

### The genus *Austrothrips*

The generic name *Austrothrips* is a particular problem because the identity of the type species remains unknown. Three further species have been described in this genus, and re-examination of the original specimens of each one has indicated that they are not closely related to each other, and that each requires a new generic placement. The genus was erected by Brethes (1915) for a single new species from Argentina, *A. verae* Brethes. The only recorded population of this species was collected from a Basidiomycete fungus, and the description states and illustrates that the male is wingless with no ocelli and with a prominent narrow fore tarsal tooth. But *verae* has not been studied by any taxonomist other than the describer, and the original specimens appear to have been lost (teste Carlos de Borbon, xi.2019). The description, and the association with a Basidiomycete fungus, suggest that *verae* belongs in some genus of fungus-feeding Phlaeothripinae. Indeed, *Austrothrips* may prove to be a synonym of *Hoplothrips*, a worldwide genus exhibiting much variation in structure among species (Mound *et al.* 2020). The name *Austrothrips* thus becomes a *nomen dubium*, as well as *verae*, until such time that suitable specimens can be collected in Argentina. The three other species described in the genus seem to have been placed there primarily because of the presence of long, capitate major setae on the pronotum, and the descriptions do not provide suitable character states for reassessing their relationships within the Phlaeothripinae. Original material of each of these species has therefore been studied, and each species is here transferred to a different genus.

### *Ocnothrips cochinchinensis* (Karny) comb.n.

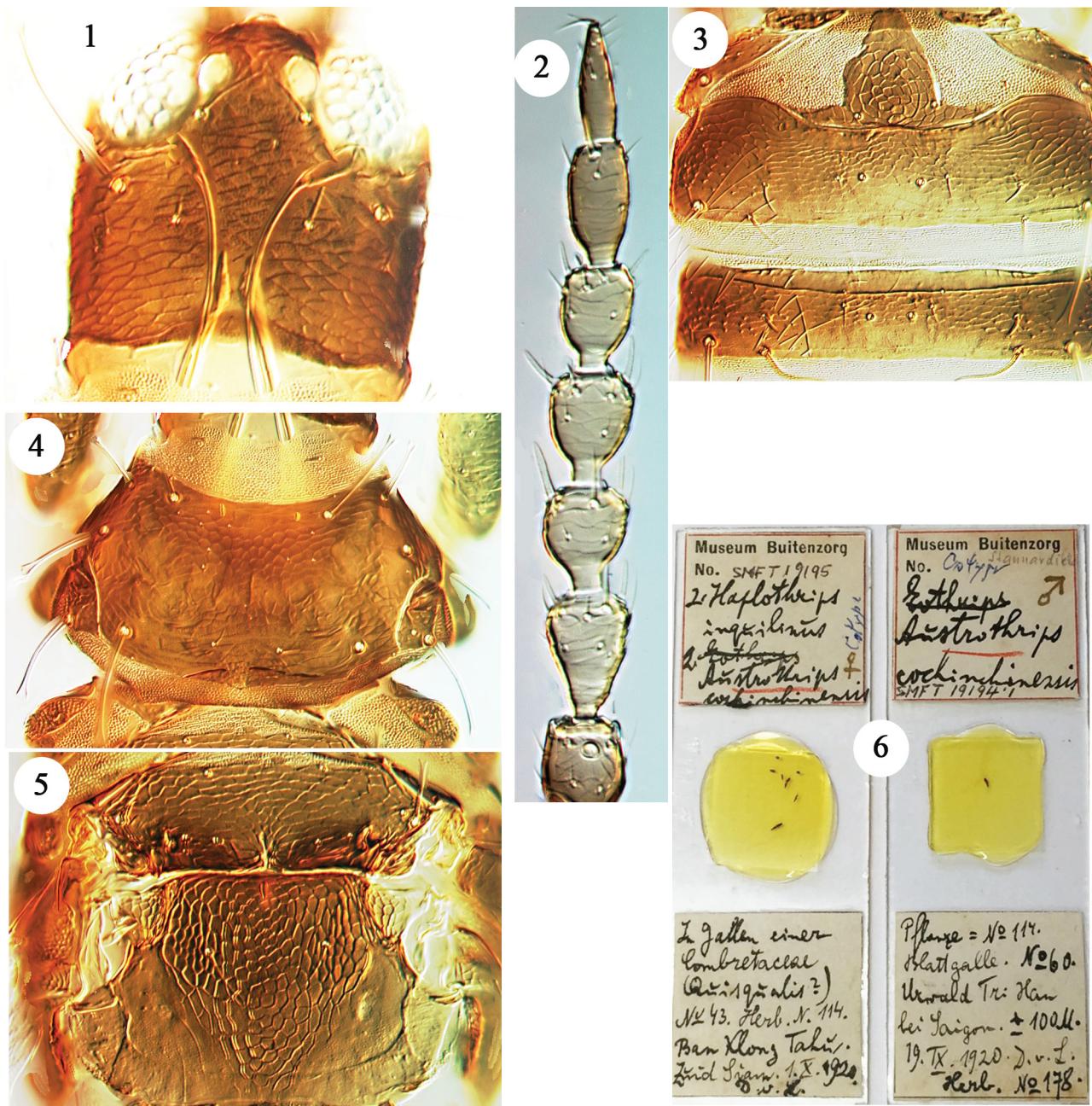
(Figs 1–6)

*Austrothrips cochinchinensis* Karny, 1922: 113.  
*Ocnothrips indicus* Ananthakrishnan, 1969: 188. **Syn.n.**

The genus *Ocnothrips* was erected for a single new species, *indicus*, of which the author gave details of the holotype male together with the statement “Paratype: same locality together with holotype”. It is not clear from this if there was a single paratype or several paratypes. These specimens were found in a leaf gall on a species of *Piper* in Kerala, southwestern India. Also in this gall were adults of two species now placed in the genus *Liothrips* that are known to be gall-inducers on leaves of *Piper* species. Thus the relationship of *indicus* to this gall also remains unclear. Curiously, in his extensive studies on gall thrips, Ananthakrishnan (1978) did not mention *Ocnothrips*, although Ananthakrishnan & Sen (1980) indicated in a footnote on page 38 that “*Ocnothrips*” was “similar to *Austrothrips*” and this is here assumed to be a spelling error. The type specimens of *O. indicus* have not been studied, but two females are listed below that were identified as this species by the Zoological Survey of India (pers. comm. R. Varatharajan ii.2020). These specimens, together with Ananthakrishnan’s original illustrations and the statement quoted above, lead to the conclusion that *indicus* and *cochinchinensis* are not only congeneric but represent the same species. The pelta of *indicus* as illustrated by Ananthakrishnan is similar in shape and sculpture to that of *cochinchinensis*, and the antennae are also similar in form. In contrast, the description of *indicus* makes no mention of reticulate sculpture on the head and metanotum.

The plant associations of this thrips require further study. Certainly, in western India it induces pouch galls on the Combretaceae species, *Getonia floribunda*. But *indicus* was described from adults taken on a species of *Piper*, and according to Thang Johnson (pers. comm. 2020) this thrips has also been taken from leaf galls on *Piper* at the University of Manipur. Ananthakrishnan (1969) indicated the leaf-roll galls in which *indicus* adults were taken were induced by one or two thrips species that are now placed in the genus *Liothrips*. There is thus no clear evidence of *cochinchinensis* actually inducing galls on *Piper* species; its presence in such galls could well be another example

of the typical thigmotactic habit of many thrips species. However, Thang Johnson has also indicated that this thrips species has been found in galls on *Quercus*, and that larval thrips were also found in these galls. This association requires further field studies, in order to test the assumed monophagy of *cochinchinensis*. The following description is to supplement the notes in Karny (1922).



**FIGURES 1–6.** *Ocnothrips cochinchinensis*. (1) head; (2) antenna; (3) pelta and tergites I–II; (4) pronotum; (5) mes and metanotum; (6) type slides.

*Male and female macropterae.* Body brown, tarsi and apices of tibiae yellow, antennal segments III–VI brownish-yellow, VII–VIII light brown; fore wings weakly shaded, darker near base, clavus dark; major setae pale. Head with irregular reticulation (Fig. 1), particularly on posterior half, genae overlap eyes laterally; postocular setae capitate, longer than eye length; maxillary stylets retracted to eyes, close together medially with small maxillary bridge. Antennae 8-segmented (Fig. 2), VIII slender, IV–VI almost moniliform; III–V each with 2 sense cones of which the outer is usually larger than the inner, but segment IV sometimes bears 3 sense cones (including 2 antennae of the syntypes). Pronotum with notopleural sutures complete (Fig. 4); with 5 pairs of long capitate major setae, epimeral setae sometimes duplicated, am setae longer than aa setae. Fore tarsus with no tooth in either sex. Mesonotal lateral setae capitate (Fig. 5); metanotum reticulate, median setae variable from bluntly pointed to broadly capitate.

Prosternal basantra absent, ferna wide apart, mesopresternum transverse but slender; metathoracic sterno-pleural sutures well developed. Pelta reticulate with prominent lateral wings; tergites II–VII each with 2 pairs of sigmoid wing-retaining setae, posterior pair strongest on each tergite; tergite II with no discal setae laterally; tergite IX setae S1 and S2 capitate and about two-thirds as long as tube; Sternites each with one pair of long marginal setae; discal setae small in irregular transverse row. Male tergite IX setae S2 capitate and shorter than S1, sternite VIII with no pore plate.

**Specimens studied.** Cotypes of *cochinchinensis*, **Thailand**, Southern Siam, Ban Klang Tahu, female in gall of a Combretaceae (*Quisqualis*?), 1.x.1920; **Vietnam**, near Saigon, male from leaf gall, 19.ix.1920, in Senckenberg Museum, Frankfurt.

Non-types. **India**, Nagaland, Kikruma, 2 females from *Quercus dealbata* leaf gall, 7.vi.2001 (Varatharajan); Kerala, Malappuram, Calicut University, 22 females, 14 males, with larvae from galls on *Getonia floribunda*, 7.viii.2019 (Nasser), in ANIC, Canberra.

***Teuchothrips flavitibia* (Moulton) comb.n.**

(Figs 7–9)

*Austrothrips flavitibia* Moulton, 1940: 261

Described from New Guinea as taken from leaf galls on an unidentified plant, the original specimens of this species have now been re-examined. Both sexes have one sense cone on antennal segment III and three sense cones on segment IV, and these sense cones are long and slender, each extending to the mid-point of the succeeding segment. The prosternal basantra are absent and the mesopresternum is reduced to a pair of lateral triangles. These character states indicate that *flavitibia* is a member of the *Liothrips*-lineage in the Phlaeothripinae, and thus unrelated to the fungus-feeding *verae*. The fore tarsus of the female lacks a tarsal tooth, but the male has a large fore tarsal tooth with the fore femora rather swollen. The head, pronotum, metascutum and lateral thirds of the tergites are distinctly reticulate (Figs 7–9). Tergite IX setae S1 and S2 are capitate in both sexes, with S1 a little more than half as long as the tube, but S2 in males is scarcely longer than the basal width of the tube. The male has no pore plate on sternite eight. This species is closely similar to several undescribed species in the genus *Teuchothrips* that are known from northern Australia (Mound 2008), and is here transferred to that genus.

**Specimens studied.** Holotype female, **New Guinea**, Koitaki, from galls on creeper, 28.xii.1928, in Bishop Museum, Hawaii. Paratypes, 4 females, 4 males taken with holotype, in California Academy of Sciences.

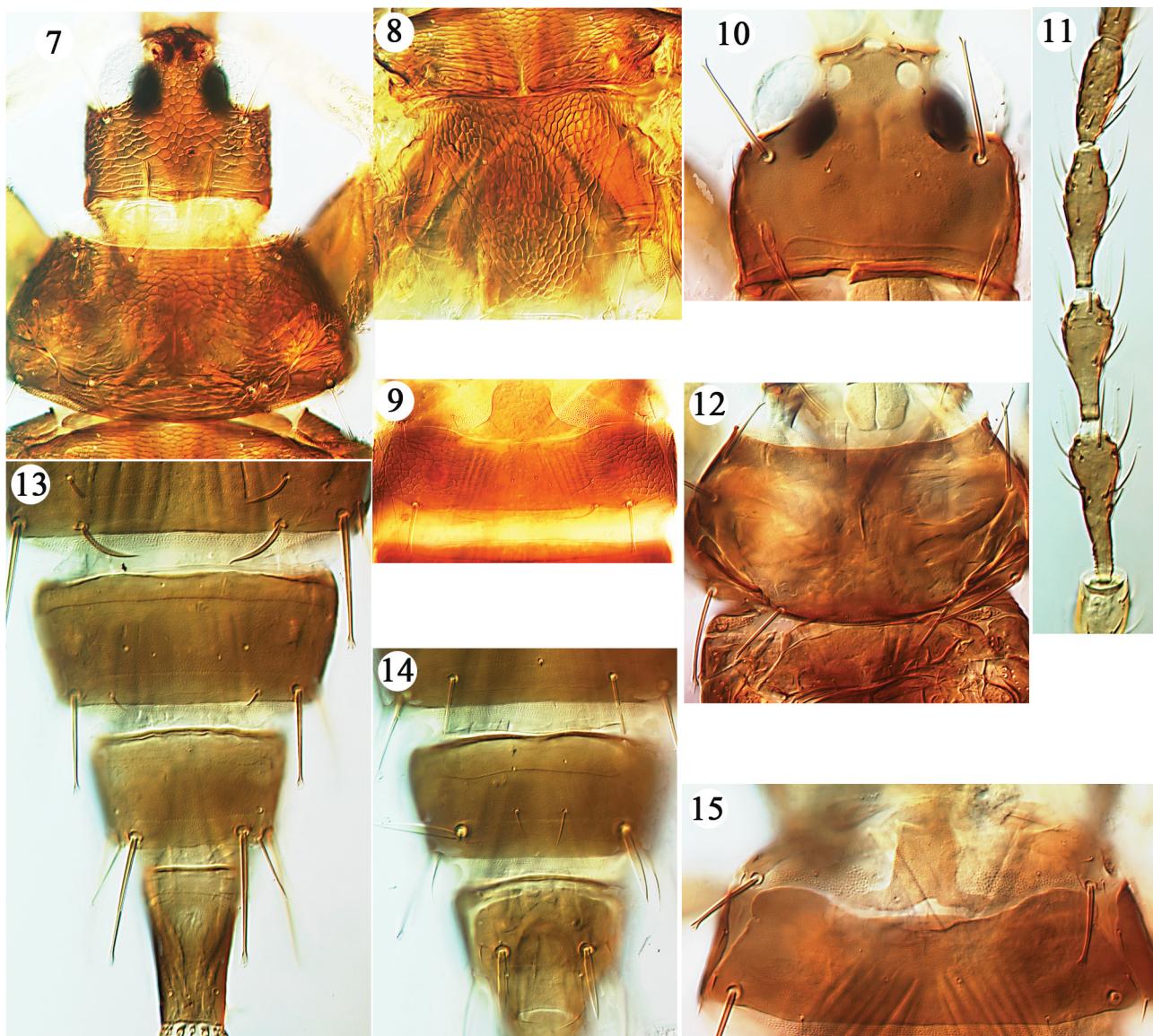
***Solomonthrips vanuaensis* (Moulton) comb.n.**

(Figs 10–15)

*Austrothrips vanuaensis* Moulton, 1944: 285

Described from Fiji based on a single micropterous male, this holotype has now been re-examined. It shares many character states with the eight described species of *Solomonthrips*, particularly the presence on tergite VIII of a pair of curved wing-retaining setae (Fig. 13), but also including the following: antennae with segment VIII long and slender, and two sense cones on each of antennal segments III and IV; head constricted behind the eyes with the stylets wide apart (Fig. 10); pronotum with only four pairs of major setae (Fig. 12); prosternal basantra present; pelta bell-shaped (Fig. 15); male sternite VIII without pore plate; male tergite IX setae S2 not shorter and stouter than S1. Only three other Phlaeothripinae genera share with *Solomonthrips* the character state of wing-retaining setae on tergite VIII (Dang *et al.* 2014), together with one of the six species in the genus *Neurothrips* (see Mound & Marullo 1996). The single species placed in *Lizalothrips*, described from The Philippines, shares with *vanuaensis* the presence of a single pair of weakly curved setae on tergite VIII, but the compound eyes are large and elongate ventrally, and the pronotum bears five pairs of major setae. The single species placed in *Propesolomonthrips*, also described from The Philippines, has two pairs of curved setae on tergite VIII, the pronotum with five pairs of major pronotal setae, the metanotum closely striate longitudinally, and antennal segment IV with three sense cones. Similarly, the eight species described in *Phylladothrips* have two pairs of wing-retaining setae on tergite VIII, but antennal seg-

ments III and IV have three and four sense cones respectively. The species *vanuaensis* differs from the species of all four of these genera in having the pronotal anteromarginal setae minute (Fig. 12). From the described species of *Solomonthrips* it differs in lacking sculpture on the head and metanotum (Fig. 10), and it is unique among Phlaeothripinae in having a pair of remarkably stout, flattened setae on each of sternites VIII and IX (Fig. 14).



**FIGURES 7–15.** Species transferred from *Austrothrips*. *Teuchothrips flavitibia* 7–9: (7) holotype head and pronotum; (8) holotype meso and metanotum; (9) paratype pelta and tergite II. *Solomonthrips vanuaensis* holotype 10–15: (10) head; (11) antenna; (12) pronotum; (13) tergites VII–X; (14) sternites VII–IX; (15) pelta and tergite I.

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## References

- Ananthakrishnan, T.N. (1969) New gall thrips from India (Ins., Thysanoptera, Phlaeothripidae). *Senckenbergiana Biologica*, 50, 179–194.
- Ananthakrishnan, T.N. (1978) Thrips galls and gall thrips. *Technical Monograph of the Zoological Survey of India*, 1, 1–69.
- Ananthakrishnan, T.N. (1984a) Adaptive strategies in cecidogenous insects. In: Ananthakrishnan T.N. (Ed.), *Biology of Gall Insects*. Oxford and IBH, New Delhi, pp. 1–9.
- Ananthakrishnan, T.N. (1984b) Biology of gall thrips (Thysanoptera: Insecta). In: Ananthakrishnan, T.N. (Ed.), *Biology of Gall Insects*. Oxford and IBH, New Delhi, pp. 107–127.
- Ananthakrishnan, T.N. (1992) Unique aspects in the biology of thrips-induced galls. In: Shorthouse, J.D. & Rohfritsch, O. (Eds.), *Biology of Insect-induced galls*. Oxford University Press, Oxford, pp. 185–195.
- Ananthakrishnan, T.N. & Raman, A. (1989) *Thrips and gall dynamics*. Oxford & IBH Publ. Co., New Delhi, 120 pp.
- Ananthakrishnan, T.N. & Sen, S. (1980) Taxonomy of Indian Thysanoptera. *Zoological Survey of India*, Handbook Series, 1, 1–234.
- Brethes, J. (1915) Descripcion de un Genero nuevo y una nueva especie de Thysanoptero de la Republica Argentina. *Annales Museo Nacional*, 27, 89–92.
- Dang, L-H., Mound, L.A. & Qiao, G-X. (2014) Conspectus of the Phlaeothripinae genera from China and Southeast Asia (Thysanoptera, Phlaeothripidae). *Zootaxa*, 3807 (1), 1–82.  
<https://doi.org/10.11646/zootaxa.3807.1.1>
- Karny, H. (1922) Thysanoptera from Siam and Indo-China. *Journal of the Siam Society*, 16, 91–153.
- Moulton, D. (1940) Thysanoptera from New Guinea and New Britain. *Occasional Papers of the Bishop Museum*, 15, 243–270.
- Moulton, D. (1944) Thysanoptera of Fiji. *Occasional Papers of the Bishop Museum*, 17, 267–311.
- Mound, L.A. (2008) Identification and host associations of some Thysanoptera Phlaeothripinae described from Australia pre-1930. *Zootaxa*, 1714 (1), 41–60.  
<https://doi.org/10.11646/zootaxa.1714.1.5>
- Mound, L.A. & Marullo, R. (1996) The Thrips of Central and South America: An Introduction. *Memoirs on Entomology, International*, 6, 1–488.
- Mound, L.A., Wang, J. & Tree, D.J. (2020) The genus *Hoplothrips* in Australia (Thysanoptera, Phlaeothripinae), with eleven new species. *Zootaxa*, 4718 (3), 301–323.  
<https://doi.org/10.11646/zootaxa.4718.3.1>
- Rao, Y.R. (1924) A gall-forming thrips on *Calycopteris floribunda*: *Austrothrips cochinchinensis*. *Agricultural Journal of India*, 19, 435–437.
- ThripsWiki (2020) *ThripsWiki—providing information on the World's thrips*. Available from: [http://thrips.info/wiki/Main\\_Page](http://thrips.info/wiki/Main_Page) (accessed 28 February 2020)